Basic Switches

BZ Series

These switches have been used extensively and have earned the high respect of our customers. Standard basic switches BZ Series are representative of Yamatake basic switches for their range of models and high performance.

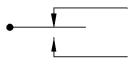
SELECTION GUIDE

Actuators \ Classification	Standard type	Low current load type
Pin plunger	●	●
Short plunger	●	●
Panel mount plunger	●	●
Panel mount roller plunger/ cross roller plunger	●	●
Fine plunger	●	●
Lever	●	●
Roller lever	●	●
Short roller lever	●	●
One-way roller lever	●	●
Reverse action lever	●	●
Reverse action roller lever	●	●
Reverse action short roller lever	●	●

RATING/TERMINAL TYPE

Item / Type	Electrical rating	Catalog listing	Screw terminal
Standard	10 A	BZ-2R	●

CONTACT & TERMINAL TYPE

Item / Type	Catalog listing	Circuit configuration
Single-Pole Double-Throw (SPDT)	BZ-2R	

CONTACT SPACING

In catalog listings for basic switches, the following code indicates the contact spacing

(Example) BZ-**2R**-T4-J

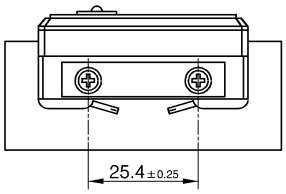
Code	Contact spacing	Features
2R	0.5mm	Basic model, high accuracy, and long life

BASIC TYPE COMPLIANT WITE EN (IEC) STANDARDS

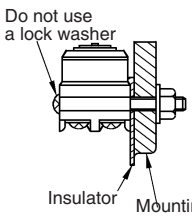
EN (IEC) compliant standard type BZ models are available. For details, see page F-006.

SWITCH MOUNTING METHOD

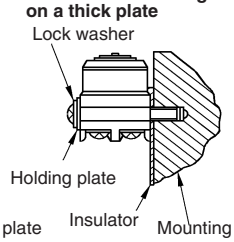
● When mounting by the side screws



Method for mounting on a thin plate



Method for mounting on a thick plate



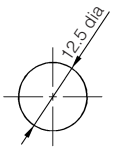
Mounting screw

BZ·····Use M4 screws.
Tightening torque must be 1.3 to 1.7N-m.

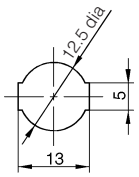
●Panel mounting (catalog listing BZ-2RQ□-□-J)

- When mounting on a panel, limit the tightening torque of the hexagon head nut on the actuator to 4.90N-m.
- When mounting the panel mount plunger/roller plunger on the side panel, the switch is sometimes damaged if the dog startup angle or operation speed is too large. Note that switch is sometimes damaged also if there is too much impact or movement after operation.
- Drill the mounting holes as follows:

Panel mount plunger



Panel mount roller plunger



General-purpose Basic Switches: BZ Series

High-quality switches with UL/CSA certification.

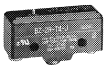
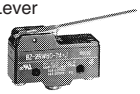
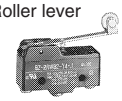
*UL approval number: E37559. CSA: LR21098

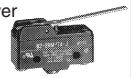
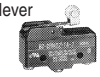
- Wide range of types
  - Standard type
  - Reverse action lever type (effective when there is impact operation)
- A wide range of actuators is available. Select the actuator according to your specific requirements and conditions of use.
- Mechanical life: 20 million cycles (pin plunger type)
- EN 60947-5-1 (IEC 60947-5-1) and CCC compliant types are available.

APPLICATIONS
- Machine tools and various industrial machinery
- Control of pressure, temperature, fluid level, weight, speed and time
- Household equipment, automobiles and control equipment

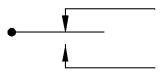
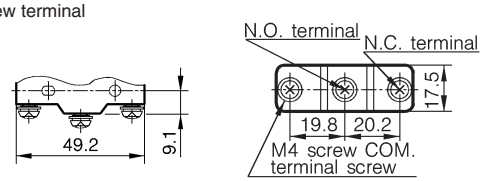
ORDER GUIDE

● Standard type

Actuators / Property	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Standards certification	Catalog listing
Pin plunger 	2.50 to 3.63	Min. 1.12	—	Max. 0.4	15.9±0.4	Min. 0.13	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2R-T4-J**
Short plunger 	2.50 to 3.63	Min. 1.12	—	Max. 0.4	21.2±0.5	Min. 1.5	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RD-T4-J**
Panel mount plunger 	2.50 to 3.63	Min. 1.12	—	0.4	21.8±0.8	Min. 5.6	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RQ1-T4-J**
Panel mount roller/ Cross roller plunger 	2.50 to 3.63	Min. 1.12	—	0.4	33.3±1.2	Min. 3.6	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RQ18-T4-J** (roller) **BZ-2RQ181-T4-J** (cross roller)
Fine plunger 	2.50 to 3.63	Min. 1.12	—	Max. 0.4	28.2±0.5	Min. 1.5	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RS-T4-J**
Lever 	Max. 0.69	Min. 0.14	27.4±0.7	—	19.1±0.7	Min. 5.6	0.18 to 1.27	M4 screw	UL/CSA	**BZ-2RW80-T4-J**
Roller lever 	Max. 0.98	Min. 0.20	35.7±0.7	—	30.2±0.7	Min. 4	0.1 to 1.02	M4 screw	UL/CSA	**BZ-2RW82-T4-J**
Short roller lever 	Max. 1.57	Min. 0.42	32.2±0.4	—	30.2±0.4	Min. 2.4	0.08 to 0.51	M4 screw	UL/CSA	**BZ-2RW822-T4-J**

Actuators / Property	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Standards certification	Catalog listing
One-way roller lever 	Max. 1.57	Min. 0.42	43.3±0.4	—	41.3±0.4	Min. 2.4	0.08 to 0.51	M4 screw	UL/CSA	**BZ-2RW826-T4-J**
Reverse action lever 	Max. 1.67	Min. 0.27	25±1.2	—	19.1±0.8	Min. 5.6	0.1 to 0.9	M4 screw	UL/CSA	**BZ-2RM-T4-J**
Reverse action roller lever 	Max. 2.35	Min. 0.56	35±1	—	30.2±0.8	Min. 4	0.05 to 0.7	M4 screw	U/CSA	**BZ-2RM2-T4-J**
Reverse action short roller lever 	Max. 5.30	Min. 1.67	31.5±0.5	—	30.2±0.5	Min. 2	0.03 to 0.3	M4 screw	UL/CSA	**BZ-2RM22-T4-J**

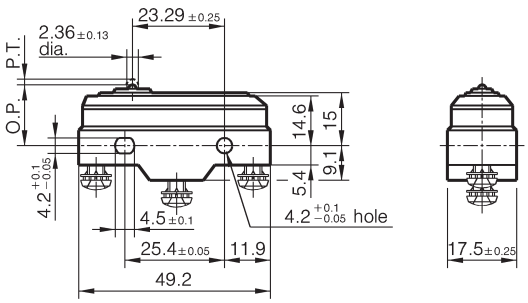
●Circuit configuration and terminal diagrams

Model	Circuit configuration	Terminal dimensions	Switch mounting screw
BZ-2R□□	Single-pole double-throw (SPDT) 	Screw terminal  Note: On reverse action types, the N.O. and N.C. terminal positions are reversed.	M4 screw

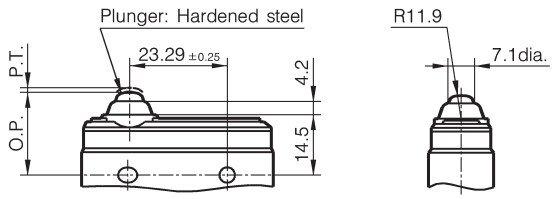
External Dimensions

unit: mm
General tolerance: ±0.4mm

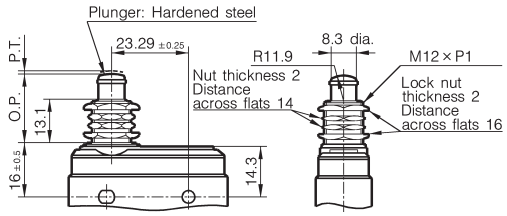
BZ-2R-T4-J



BZ-2RD-T4-J

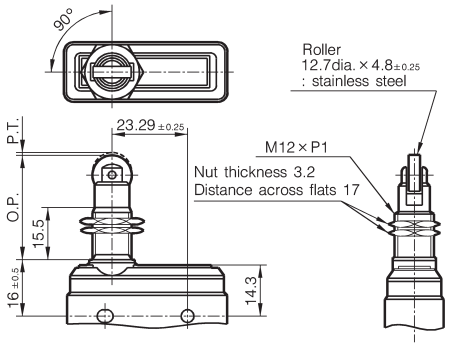


BZ-2RQ1-T4-J

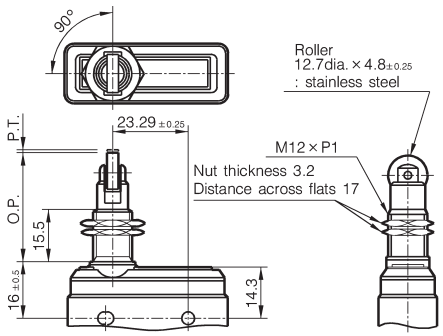


BZ-2RQ18-T4-J

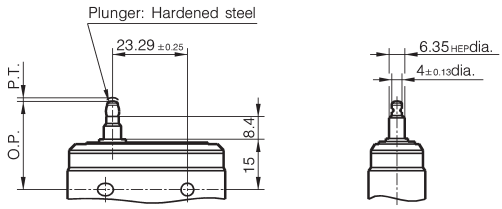
unit: mm
General tolerance: ±0.4mm



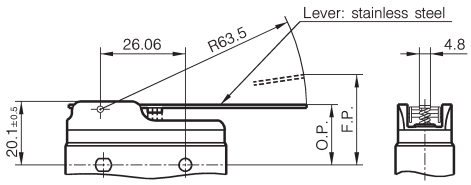
BZ-2RQ181-T4-J



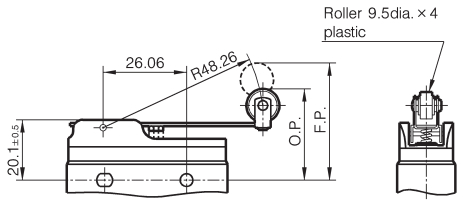
BZ-2RS-T4-J



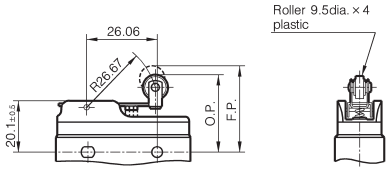
BZ-2RW80-T4-J



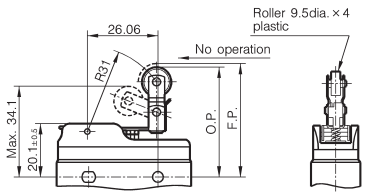
BZ-2RW82-T4-J



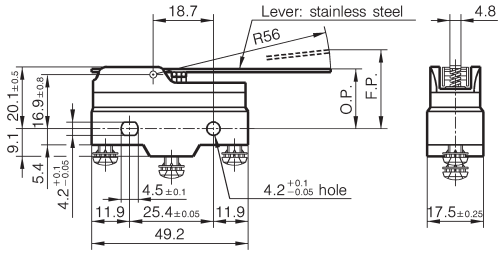
BZ-2RW822-T4-J



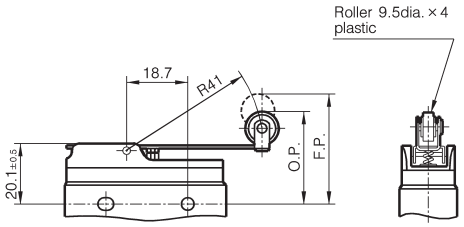
BZ-2RW826-T4-J



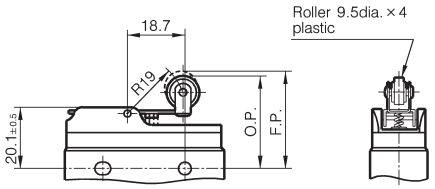
BZ-2RM-T4-J



BZ-2RM2-T4-J



BZ-2RM22-T4-J



LOW CURRENT LOAD TYPE (cross point contacts)

Standard low current load BZ switches are produced regularly. For details on other types, contact your Yamatake deales.

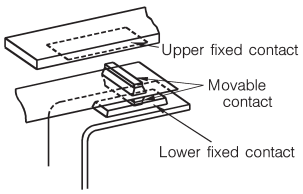
● Features

- With cross point contacts, contact is concentrated at one location to enable reliable contact pressure.
- Gold alloy contacts are used for stable contact resistance at all times.
- These switches are ideal when minor changes in contact resistance are a problem, for example when switching low current loads.

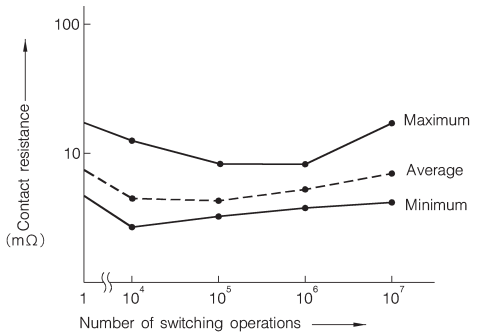
● Applications

- Copiers
- Peripheral and terminal equipment
- Automatic vendors
- NC machine tools
- Switching of miniature loads such as transistors and ICs

● Enlarged view of contact area



Gold alloy cross point contact



Actuators / Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Standard certification
Characteristics are the same as for general purpose standard type. Refer to the page above.									

Note: Low current load models end in -JK, with K appended to -J at the end of the model number.

SPECIFICATIONS

Type			Standard	Low current load
Representative catalog listing			BZ-2R-T4-J	BZ-2R-T4-JK
External standards	Compliance		NECA C 4505	
	Certification		UL/CSA	—
Structure	Contact type		Single-pole double-throw (SPDT)	
	Contact shape		Rivet	Cross point
	Contact material		Silver alloy	Gold alloy
	Terminal type		M4 screw terminal	
Electrical rating			See Tables BZ.1 and BZ.2	
Electrical characteristics	Dielectric strength	Between non-continuous terminals	1,000V	Refer to respective type.
		Between each terminal and non-live metal part	2,000V	1,250V
		Between each terminal and ground	2,000V	1,250V
	Insulation resistance		Min. 100MΩ(by a 500Vdc megger)	
	Initial contact resistance		50mΩ	
	Temperature rise		30˚C	50˚C
	Inrush current		N.C.:AC 250V-30A, N.O.:AC 250V-15A	—
Mechanical characteristics	Actuator strength		Withstands load 10 times O.F. (operating direction) for 1 minute	
	Terminal strength		M4 screw terminal: Withstands torque 1.2N-m for 1 minute M3 screw terminal: Withstands torque 0.8N-m for 1 minute	
	Impact resistance**		300m/s²*	Refer to respective type.
	Vibration resistance**		1.5mm peak-to-peak amplitude, frequency 10 to 55Hz, for 2 continuous hours*	
	Allowable operating speed		0.01mm/s to 0.3m/s*	
	Operating cycle		Max. 240 cycles/min	
Life	Mechanical		Min. 20 million cycles, operating frequency 60 cycles/min*	
	Electrical		250Vac-15A resistive load, min. 500,000 cycles	Min. 125Vac-0.1A resistive load, 20 million cycles
Environmental characteristics	Operating temperature		−20 to +70˚C	
	Operating humidity		Max. 85% RH	
Mounting	Recommended torque		1.3 to 1.7N-m (M4 screw)	
	Insulation		Use an isolator when mounting.	

* Value for the specified representative catalog listing. Unmarked values are common to models in the series.
** contact misoperation in the free position and final overtravel position is 1 ms or less.

● Table BZ. 1 Electrical rating

Series	BZ-2R	Low current load BZ
Rating	UL/CSA rating, 125, 250, 480Vac-10A, 1/8HP-125Vac, 1/4HP-250Vac, 125Vdc-1/2A 250Vdc-1/4A	125Vac-0.1A, 30Vdc-0.1A

● Table BZ. 2 Electric duty 1

Rating	AC rating												DC rating									
Rated voltage	125Vac				250Vac				480Vac				8Vdc		14Vdc		30Vdc		125Vdc		250Vdc	
Switching load	Resistance	Induction	Electric motor		Resistance	Induction	Electric motor		Resistance	Induction	Electric motor		Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction
			N.C.	N.O.			N.C.	N.O.			N.C.	N.O.										
BZ-2R□□	10	6	3	1.5	10	6	2	1	1	0.5	—	—	10	10	10	5	3	2.5	0.5	0.05	0.25	—

CERTIFIED EN (IEC) COMPLIANT BZ MODELS

Standards: EN 60947-5-1 (IEC 60947-5-1)

EN compliant standard products are available.

● BZ Series basic switches

Actuator Name/Shape	Contact		Catalog listing
	Normal load	Low current load	
Pin plunger	●		BZ-2R3000-T4-J
		●	BZ-2R3000-T4-JK
Short plunger	●		BZ-2RD3000-T4-J
		●	BZ-2RD3000-T4-JK
Fine plunger 	●		BZ-2RS3000-T4-J
		●	BZ-2RS3000-T4-JK
Lever	●		BZ-2RW3000-T4-J
		●	BZ-2RW3000-T4-JK
Roller lever	●		BZ-2RW3001-T4-J
		●	BZ-2RW3001-T4-JK

Actuator Name/Shape	Contact		Catalog listing
	Normal load	Low current load	
Short roller lever	●		BZ-2RW3003-T4-J
		●	BZ-2RW3003-T4-JK
One-way roller lever 	●		BZ-2RW3005-T4-J
Panel mount plunger 	●		BZ-2RQ3000-T4-J
		●	BZ-2RQ3000-T4-JK
Panel mount roller plunger 	●		BZ-2RQ3001-T4-J
		●	BZ-2RQ3001-T4-JK
Panel mount cross roller plunger 	●		BZ-2RQ3002-T4-J
		●	BZ-2RQ3002-T4-JK

Note: Electrical rating for EN (IEC) compliant switches
BZ-2R·····Standard load: 250Vac-3A, 30Vdc-1A
Low current load: 125Vac-0.1A, 30Vdc-0.1A
Note: Approving bodys TÜV Rheinland, Approval No. R9551070
Note: UL/CSA certification also acquired
Note: For details of operation specifications, refer to the same actuator under BZ general purpose switches.

● Specifications

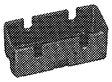
Rated operating voltage	Standard load	250Vac or 30Vdc
	Low current load	125Vac or 30Vdc
Application category and rating	Standard load	AC-15 3A-250Vac, DC-12 1A-30Vdc
	Low current load	AC-12 0.1A-125Vac, DC-12 0.1A-30Vdc
Rated frequency		45 to 65Hz or “d.c.”
Rated insulating voltage (Ui)		250Vac
Rated impulse dielectric strength (Uimp)		4,000V
Rated energizing current (Ith)	Standard load	15A
	Low current load	1A
Short-circuit protection mechanism		Instant blowing fuse 15A, ABC 15(15A) made by Bussmann or equivalent
Conditional rated short-circuit current		1000A
Switching overvoltage		-,L,M,N,W,S,Q: Category III D,B: Class II
Electrical protection		N.A.

Note: CCC compliant model also available

PRECAUTIONS FOR USE OF BZ SERIES

1. Teminal protection cover

Because this cover is secured with the switch mounting screws, handling is easy and accidental contact with exposed terminals is prevented.



5PA2-J
For screw terminal

2. Mounting

- We recommend combined use of a spring washer and adhesive lock to prevent the screw from coming loose.
- Make sure that sufficient insulating space is maintained between terminals and ground when the switch is mounted.
- Ensure that no force is applied to the actuator when it should be in a free state, and that force is applied along the axis of actuator motion
- Set function after operating to at least 70% of the rated O.T. as the standard setting.
- When mounting a lever type switch, do not apply unnecessary force from the direction opposite to the operating direction or from the side.

3. Wiring

Tighten using round or open tip (Y-shaped) crimped terminals with a torque of 0.6N-m or less.

4. Selecting the switch

Select the switch taking into consideration that the switch should not malfunction even if the operating characteristics change by 20% of the rated values.

5. Environmental considerations

Avoid use at dusty locations or at locations subject to corrosive gases or silicon that may adversely influence the contacts.

6. Handling precautions

- When using the switch for switching inductive loads (relays, solenoids, buzzers, etc.), arc may cause the contacts to malfunction. To prevent this, we recommend inserting an adequate spark eliminating circuit.
- Reliability may drop if synchronization occurs in the AC circuit.

7. Checking the actual load

To improve reliability during actual use, we request that you check the quality of the switch in an actual operating state.